power level of the radiation beam provided by the radiation source based on an absorbed radiation dose which is based on a difference between the intensity of the radiation beam provided by the radiation source and the intensity of the radiation beam that passes through the product.

2. The irradiation system of claim 1, wherein the radiation source provides an electron beam.

3. The irradiation system of claim 1, wherein the radiation source provides an x-ray beam.

4. The irradiation system of claim 1, wherein the product location system comprises a conveyor.

5. (Amended) An irradiation system comprising:

a radiation source for providing a radiation beam at a first controlled intensity, the radiation beam having a beam current and having at least an x-ray component with a second intensity that is proportional to the first intensity;

a current sensor coupled to the radiation source for measuring the beam current provided by the radiation source;

a product location system for advancing the product past the radiation beam at a controlled speed, so that the radiation beam impinges on the product;

a sensor system for measuring a third intensity of a portion of the x-ray component of the radiation beam that passes through the product;

a control system for calculating the second intensity of the x-ray component of the radiation beam based on the measured beam current provided by the radiation source, and for adjusting the first intensity of the radiation beam based on an

absorbed radiation dose which is based on a difference between the third intensity of the portion of the x-ray component of the radiation beam that passes through the product and the second intensity of the x-ray component of the radiation beam.

6. The irradiation system of claim 5, wherein the radiation source provides an electron beam.

7. The irradiation system of claim 5, wherein the radiation source provides an x-ray beam.

8. The irradiation system of claim 5, wherein the sensor system includes a scaled linear x-ray sensor array.

9. (Amended) The irradiation system of claim 8, wherein the sensor system further includes an attenuator plate for scaling the third intensity of the portion of the x-ray component of the radiation beam that passes through the product to correspond with a dynamic range of the linear x-ray sensor array.

10. The irradiation system of claim 5, wherein the product location system comprises a conveyor.

11. (Amended) An irradiation system comprising:

a radiation source for providing a radiation beam having a beam current and having a first intensity profile, the radiation beam having at least an x-ray component with a second intensity profile that is proportional to the first intensity profile;

a current sensor coupled to the radiation source for measuring the beam current

provided by the radiation source;

a product location system for providing product so that the radiation beam impinges on the product;

a sensor system for measuring a third intensity of a portion of at least part of the x-ray component of the radiation beam that passes through the product;

a control system for calculating the second intensity profile of the x-ray component of the radiation beam based on the measured beam current provided by the radiation source, and for interpreting measurements taken by the sensor system to determine a relative location and type of the product that the radiation beam impinges upon, the control system being responsive to the determined relative location and type of the product to adjust at least one of the first intensity profile of the radiation beam, a location pattern of successive radiation beams, and a speed of advancement of product by the product location system.

12. (Amended) A method of irradiating product, comprising:

providing a radiation beam having a controlled beam current;

measuring the beam current of the radiation beam;

directing the radiation beam onto product;

measuring an intensity of a portion of the radiation beam that passes through the product;

calculating an intensity of the provided radiation beam based on the measured beam current; and

adjusting the beam current of the provided radiation beam to adjust its intensity, based on a difference between the measured intensity of the portion of the radiation beam that passes through the product and the calculated intensity of the provided radiation beam.

13. The method of claim 12, wherein providing a radiation beam comprises generating an electron beam.

14. The method of claim 13, wherein providing a radiation beam further comprises converting the electron beam to an x-ray beam.

15. The irradiation system of claim 12, wherein directing the radiation beam onto product comprises advancing product past the radiation beam on a conveyor.

16. (New) An irradiation system comprising:

a radiation source comprising:

an accelerator for providing an electron beam having a beam current

a current sensor coupled to the accelerator for measuring the beam current of the electron beam;

a magnet assembly for controllably shaping and directing the electron beam; and

a scan horn providing an exit path for the electron beam;

a product location system for providing product so that the electron beam impinges on the product;

a radiation sensor system for measuring an intensity of an x-ray portion of the electron beam that passes through the product; and

a control system for calculating a first radiation dose based on the beam current measured by the current sensor, a second radiation dose based on the intensity of the x-ray portion of the electron beam that passes through the product measured by the radiation sensor, and an absorbed radiation dose based on a difference between the first radiation dose and the second radiation dose, and